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State of Utah

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DIVISION OF OIL, GAS AND MINING

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May 13, 1999

TO: File *DR7A*

THRU: Daron Haddock, Permit Supervisor

FROM: James D. Smith, Reclamation Specialist *JDS*

RE: Technical Analysis for Lila Canyon, Utah American Energy, Inc., Horse Canyon Mine, ACT/007/013-98-1, File 2, Emery County, Utah.

SUMMARY

TECHNICAL ANALYSIS

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR Sec. 783., et. al.

GENERAL CONTENTS

Regulatory Reference: R645-302.122.

Referenced materials not on file at the Division or readily available to the Division will be provided upon request of the Division by the applicant (p. 15).

Outside sources are referenced many times in Chapters 6 and 7, but the outside sources are not adequately described nor listed in a reference section. Many of the publications cited are probably available to the Division and the general public through libraries, but they will be difficult to locate unless explicit citations are provided. A few are listed in Appendix 7-3, but complete "Reference" sections are needed, either one for each chapter or one comprehensive reference section for the entire PAP.

Some cited reports, such as but not necessarily limited to:

- Surface geology of Kaiser's south lease Carl property, Emery County, Utah, by V. W. McMath,
- Exploration 1974-75 of Kaiser Steel's south Lease Coal Property, Emery County, Utah, and
- Bureau of Land Management, Environmental Analysis Record, dated 6/9/76, related to Kaiser Steel's Federal lease No. U-32083

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are not readily available to the Division, other agencies, and potentially interested parties such as the public and are probably not available in most libraries. The applicant needs to provide copies of such reports as part of the PAP.

CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.18; R645-301-724.

Analysis:

The PAP contains information on the climatological factors that are representative of the proposed permit area. The information, on page 17 of Chapter 7 and Page-1 of Appendix 7-3, is minimal but includes average seasonal precipitation, average direction and velocity of prevailing winds, and seasonal temperature ranges. At this time the Division has not deemed it necessary to request additional data to ensure compliance other regulatory requirements.

Findings:

Climatological resource information provided in the PAP is minimal but is considered adequate to meet the requirements of this section.

GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 784.22; R645-301-623, -301-724.

Analysis:

Geologic information includes a description of the geology of the proposed permit and adjacent areas down to and including the stratum immediately below the lowest coal seam to be mined. The coal seams and adjacent strata comprise an aquifer that may be adversely impacted by mining. The geologic description includes areal and structural geology of the permit and adjacent areas and other parameters that may influence reclamation. It does not adequately describe how the areal and structural geology may affect the occurrence, availability, movement, quantity, and quality of potentially impacted surface and ground water.

The application does not include geologic information in sufficient detail to assist in determining the probable hydrologic consequences of the operation upon the quality and quantity of surface and ground water in the permit and adjacent areas, including the extent to which surface- and ground-water monitoring is necessary, and whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area. The information is not sufficient to assist in determining all potentially acid- or toxic-forming strata down to and including the stratum immediately below the coal seam to be mined and determining whether reclamation can be accomplished. Geologic information is not

sufficient to assist in preparing the subsidence control plan.

Required resource maps and plans and detailed site specific information are based on published geologic information, permit applications of the adjacent Sunnyside and South Lease areas, and drilling records of U. S. Steel Corporation and the Los Angeles Department of Power and Water. Some of these are included in the PAP, others are readily available, but some of the information is proprietary or otherwise not readily available to the Division and public.

On lands within the permit and adjacent areas, strata above the coal seam to be mined will not be removed, so samples have been collected and analyzed from test borings or drill cores. Bore holes S-1 through S-23 were drilled between 1948 and 1975. S-24 through S-31 were drilled in 1980 and 1981, and an unsuccessful attempt was made to convert S-26, S-28, and S-31 to ground-water observation wells.

S-26 and S-31, located south of the Williams Draw Fault, were offset with shallow piezometers A-26 and A-31 to observe ground water in the alluvium (Table 6-3). Table VI-3 does not indicate that these wells have been plugged and abandoned. Two other wells were bored in Horse Canyon to monitor water in the alluvium there, but these two wells have since been sealed according to the PAP (Chapter 7, pp. 7, 10). There are no logs or other geologic data from these four wells in the PAP.

S-32 was drilled in 1981 and completed as a piezometer in the Grassy Member of the Blackhawk Formation. The location of S-32 is not shown on any map. There are no logs or other geologic data from S-32 in the PAP.

In 1993 and 1994 IPA-1, IPA-2, and IPA-3 were drilled. Results of proximate and ash analyses of "floor" and "roof" from IPA-1, IPA-2 (roof only), and IPA-3 are in Appendix 6-2; however, the proximate analyses show these are coal samples, not samples from strata overlying and underlying the coal seam. There are also proximate, ultimate, sulfur, ash, and several other analyses for "middle" coal samples from the three bore holes. Sulfur analyses include total and pyritic sulfur.

Logs of bore holes IPA-1, IPA-2, IPA-3, S-14, S-27, and S-32 are in Appendix 6-1, and ground water was noted on the logs for IPA -1, IPA-2, S-27, and S-32. These logs show lithologic characteristics, including physical properties and thickness of each stratum that may be impacted. In addition to the bore holes, coal seams and adjacent strata were measured at seventeen out-crop locations in 1974 and 1975. Lithology and thickness of the coal seams and adjacent strata, based on the bore holes and measured out-crop sections, are shown on Plate 6-5.

Engineering properties of the strata immediately above and below the coal seam to be mined are listed in Table 6-6. Data are based on core samples from bore holes S-18 and S-22.

Access to the underground workings of the Lila Canyon Mine will be provided by two rock slopes driven up-dip from the top of the Mancos Shale to the coal seam. Rock that will be removed from the tunnels will be called "slope rock", and it fits most closely into the classification of underground development waste. The slope-rock underground development waste will contain mostly shale, sandstone, and mudstone. Traces of coal may be found, but the applicant feels the amount will be insignificant. Slope-rock will be used to fill in areas to be used as pads in the coal pile storage areas, with any additional being placed in the refuse pile, or it may be crushed and used for gravel (PAP section 528.320), although

the use for the gravel is not described.

Coal processing waste from the crusher will be placed in disposal areas within the permit area. The refuse pile has been designed as a location for the storage of underground development waste that is brought to the surface, including any excess slope-rock not used as fill; it is not anticipated that any underground waste other than the slope-rock will be brought to the surface. The capacity of the pile is designed for 150,000 tons, which is in excess of projected needs. Material not transported to the surface, such as overcast material, rock falls, and slope material may be disposed of underground according to the appropriate MSHA regulations. Because this will be an underground mine there will be no spoil

The slope-rock underground development waste will be left in place for final reclamation. The area will be covered and re-seeded as per Chapters 2 and 7 and PAP section 540 . The applicant commits to test the slope-rock underground development waste to assure that the material is composed of nonacid- or nontoxic-forming waste. However, the frequency of testing is not described in the PAP. Testing should be frequent enough and representative enough to assure that all material to be left at the surface is suitable.

The PAP contains no reports of analyses for acid- or toxic-forming or alkalinity-producing materials and their content in the strata immediately above and below the coal seam to be mined, including the rock through which the tunnels will be built, and it is not established that this material can be properly disposed of at the waste rock disposal area and that reclamation of the waste rock disposal site can be accomplished.

The applicant contends that over 100-years of mining experience at the adjacent Sunnyside Mines indicates that none of the horizons contain acid- or toxic-forming materials in quantities sufficient to be considered a problem; no data are presented to substantiate this claim, but reference is made to a BLM report (Bureau of Land Management, Environmental Analysis Record, dated 6/9/76. Related to Kaiser Steel's Federal Lease No. U-32083).

The coal seam crops out at approximately 6,500 feet in the vicinity of the rock-slope tunnels. The PAP indicates the tunnels will intercept the coal seam at approximately 6,300 feet.

Underground mining always has a potential for impacting surface-water, ground-water, and other surface resources. The applicant states on page 6 (Chapter 7) that subsidence effects are expected to be minimal due to the amount of cover and massive rock strata between the mining and the surface. Structural elevation contours on Plate 6-4 do not go higher than 6,000 feet, at least in the permit area. The coal may be shallower, under less cover, and dip more steeply than indicated on Plate 6-4 and other maps. Coal-seam elevations determined from bore holes are not on Plate 6-4, the Cover and Structure map, even though they are on Plate 6-2, which does not show structure.

The applicant has made no request to the Division to waive in whole or in part the requirements of the borehole information or analysis required of this section.

Findings:

Geologic Resource Information is not considered adequate to meet the requirements of this section. Prior to approval the applicant must provide the following information:

R645-301-623.200 - Elevation contours on Plate 6-4 do not go higher 6,000 feet, at least in the permit area. The coal may be shallower, under less cover, and dip more steeply than indicated, factors that can affect the subsidence control plan.

R645-302.122, -624.130 - Outside sources are referenced many times but the outside sources are not adequately described or listed in a "reference" section.

R645-302.122, -624.130 - Some cited reports, such as but not necessarily limited to:

- Surface geology of Kaiser's south lease Carl property, Emery County, Utah, by V. W. McMath,
- Exploration 1974-75 of Kaiser Steel's south Lease Coal Property, Emery County, Utah, and
- Bureau of Land Management, Environmental Analysis Record, dated 6/9/76, related to Kaiser Steel's Federal lease No. U-32083

are not readily available to the Division, other agencies, and potentially interested parties such as the public and are probably not available in most libraries, so the applicant needs to provide copies as part of the PAP.

R645-301-302.122, -624.130, -624.320 - The applicant asserts that over 100-years of mining experience at the adjacent Sunnyside Mines indicates that none of the horizons contain acid- or toxic-forming materials in quantities sufficient to be considered a problem; reference is made to a BLM report (see previous deficiency) but there are no data presented to substantiate this claim.

R645-301-624, -624.210 - The PAP contains no logs or other geologic data from A-26, A-31, and the two wells bored in Horse Canyon to monitor alluvial ground water.

R645-301-624, -624.210 - There are no logs or other geologic data from S-32 in the PAP.

R645-301-624.320 - There are no reported results of chemical analyses for acid- or toxic-forming or alkalinity-producing materials and their content in the strata immediately above and below the coal seam to be mined, including the rock through which the tunnels will be built.

R645-301-624.320 - The underground development waste from the slope-rock tunnels will be left in place for final reclamation. In PAP section 537.210 the applicant commits to test the slope-rock underground development waste to assure that the material is composed of nonacid- or nontoxic-forming waste; however, the frequency of testing is not described in the PAP. Testing should be frequent enough to assure that all material to be left at the surface is suitable.

HYDROLOGIC RESOURCE INFORMATION

Analysis:

Sampling and analysis.

All water-quality analyses performed to meet the requirements of R645-301-723 through -724.300, -724.500, -725 through -731, and -731.210 through -731.223 will be conducted according to the methodology in the current edition of "Standard Methods for the Examination of Water and Wastewater" or the methodology in 40 CFR Parts 136 and 434. Water-quality sampling will be conducted according to either methodology listed above when feasible (Chapter 7, p. 8).

Baseline information.

The U.S. Geological Survey conducted a water quality study in Horse Canyon from August 1978 until September 1979 during the time that U.S. Steel operated the mine. Samples were taken monthly from the Horse Canyon Creek and analyzed for most major ions and cations and field parameters. Metals, eight nitrogen species and other minor chemical constituents were taken on a quarterly basis or less. This is briefly mentioned in Appendix 7-3 but these data are not in the PAP and the results of the analyses are not discussed with the baseline information. There is no reference for the source of these data.

Between January 1981 and April 1983, baseline water quality data was collected for surface water and spring sites B-1, HC-1, RF-1 and RS-2, on the Horse Canyon permit area. Between 14 and 19 samples were taken and analyzed during the monitoring period depending on the site. The parameters that were analyzed were derived from Section 783.16 (apparently the number in the old Coal Mining Regulations). This is briefly mentioned in Appendix 7-3 but these data are not in the PAP and the results of the analyses are not discussed with the baseline information. There is no reference for the source of these data.

Two other sites, RS-1, and RS-2, were sampled once a year during 1978, 1979, and 1980 and analyzed for most major chemical constituents. In addition, springs H-6, H-18, and H-21 were sampled once and analyzed for the major constituents in 1985. Third quarter data for 1989 were collected for HC-1 and RF-1 and sampled for most of the parameters in UDOGM's guidelines. This is briefly mentioned in Appendix 7-3 but these data are not in the PAP and the results of the analyses are not discussed with the baseline information. There is no reference for the source of these data.

Ground-water information.

An unsuccessful attempt was made to convert bore-holes S-26, S-28, and S-31 to ground-water observation wells. S-26 and S-31, located south of the Williams Draw Fault, were offset with shallow piezometers A-26 and A-31 to observe ground water in the alluvium (Table 6-3); it is not clear from Table VI-3 whether or not these wells have been plugged and abandoned or if they are available for ground-water monitoring. Two other wells were bored in Horse Canyon to monitor water in the alluvium there, but these two wells have since been sealed (Chapter 7, pp. 7, 10). Section 722.400 implies these may have been water production wells. There are no hydrologic data from any of these wells in the PAP.

S-32 was drilled in 1981 and completed as a piezometer in the Grassy Member of the Blackhawk Formation. The PAP contains no data on ground-water elevation or quality for S-32 and its location is not

shown on maps.

In 1993 and 1994 IPA-1, IPA-2, and IPA-3 were drilled. There are seasonal water-level measurements in the PAP for IPA-1, IPA-2, and IPA-3 for 1994, 1995, and 1996 but not for 1997 or 1998.

Locations of all known seeps and springs are stated to be shown on Plate 7-1.

JBR Consultants Group conducted a seep and spring survey of the Horse Canyon area in 1985. Table 7-1 in the PAP contains information including flow, pH, conductivity, and temperature for nineteen seeps and springs: H-1 through H-11, H-13, H-14, H-18 through H-22, and H-92. H-1, H-6, H-18, and H-21 were sampled, possibly for further water-quality analysis but there are no analysis results in the PAP for these four springs. H-7 could not be found on Plate 7-1, and H-21A, H-21B, H18A, and H-18B are shown on Plate 7-1 but not listed or discussed in the PAP.

Appendix 7-1 contains seasonal information on ground-water quality and flow for seeps and springs 1, 9, 10, 14, 16(16Z), HC-2, HC-4, HC-9, HC-11, HC-13, HC-14, HC-18, HCSW-1. Data are from work done in 1993, 1994, and 1995 by EarthFax Engineering for the Los Angeles Department of Water and Power. Water-quality descriptions include total dissolved solids or specific conductance corrected to 25°C, pH, total iron, and total manganese at springs. Most parameters listed in UDOGM directive Tech 004 were determined in these samples; however, total hardness, total alkalinity, and acidity were not reported (bicarbonate and carbonate were reported). Total rather than dissolved concentrations were determined for all metals. H.C.-2, HC-4, HC-9, HC-11, HC-13, HC-14, HC-18, and HCSW-1 could not be found on Plate 7-1. HC-1, HC-1A, and an unidentified spring or seep 1,000 feet southeast of HCSW-2 are shown on Plate 7-1 but not listed or discussed any other place in the PAP.

EarthFax also identified springs and seeps 1A,1B, 2, 3, 3A, 3B, 3C, 3D, 4, 5, 6, 7, 8, 8A, 8B, 9R, 10A, 11, 12, 12A, 12B, 12C, 12D, 12E, 13, 13A, 13B, 13Z, 14A, 15, 15A, 15B, 15C, 16A, 16B, 16C, 17, 17A, 17B, 18, 19A, 19B, 19C, 20, 22, HCSW-2, and HCSW-3. These were dry or had low flows at the time of the quarterly visits and no water-quality analyses were done. 8B, 15A, 17B, 18A, 19C, and HCSW-3 could not be found on Plate 7-1.

Appendix 7-2 contains the 1997 Annual Hydrologic Monitoring Report for the Horse Canyon Mine with data for RS-2 (Redden Spring). Redden Spring is not identified on Plate 7-1. The quarterly samples from this spring were analyzed for all Tech 004 parameters except total manganese and acidity.

Water rights are listed in Table 7-2. The list includes Redden Spring plus springs identified as Mont, Leslie, Cottonwood, Willows, Konna, and Pine. In addition there are eleven unnamed or otherwise unidentified springs listed, plus a well. Locations of water rights are on Plate 7-3, and some of the locations on Plate 7-3 correspond roughly with springs shown on Plate 7-1.

The applicant asserts there are no water supply wells in the permit and adjacent areas (Chapter 7, p. 7) even though a well is listed in Table 7-2; Section 722.400 implies the two shallow wells in Horse Canyon may have been water production wells.

Surface-water information.

On page 7 of Chapter 7 the PAP states that the location of all known seeps and springs, as well as watering ponds or tanks are shown on Plate 7-1, and that there are no streams, lakes or ponds or irrigation ditches known to exist within the proposed permit or adjacent areas. However, on page 15 the PAP states that within the permit area the surface water resources consist of two main drainages; Horse Canyon Creek, an intermittent stream, and Lila Canyon Creek, an ephemeral drainage. The main drainage through the permit area, Little Park Wash, is mentioned on page 10 and in Tables 7-2 and 7-3 but is not further described or discussed. Likewise, Range Creek drainage is mentioned on page 10 and in Table 7-2 but is not further described or discussed.

The PAP states on page 15 that Lila Canyon Creek is an ephemeral drainage, but on page 33 and again in Table 7-3 Lila Canyon is described as intermittent. The main or left fork of Lila Canyon drains an area of several square-miles, so, assuming it is not a perennial drainage, it fits the definition of an intermittent drainage in the Coal Mining Rules. The Right Fork of Lila Canyon is described as ephemeral above the mine on page 33 but as intermittent in Table 7-3. Lila Canyon (Right Fork?) is described as intermittent "below mine" on page 33, but Table 7-3 states it is intermittent "below stream" rather than below the mine site. These inconsistent and potentially confusing descriptions need to be clarified.

The only flow data for Horse Canyon Creek in the PAP are in the Horse Canyon Mine 1997 Annual Report in Appendix 7-2. Additional data for Horse Canyon Creek are available from other annual reports of the Horse Canyon Mine and these data should be included and evaluated in the PAP. Data in Appendix 7-2 do not clearly support the statement on page 15 that "Flows in Horse Canyon, generally, are limited to the early spring period (Lines and Plantz, 1981). By late spring to early summer, usually no flow is evident in Horse Canyon Creek..." Although flows decrease, the data show there is still flow in late summer and early fall, which indicates possible perennial flow in Horse Canyon Creek above the Horse Canyon Mine. Flow in the valley does appear to be intermittent.

On page 15 of Chapter 7, the PAP states that both Horse Canyon and Lila Canyon Creek flow to Iceland Wash, which in turn flows to Grassy Trail Creek and the Price River, but topographic maps show that after the two streams emerge from the Book Cliffs their flows diverge. Water from Horse Canyon flows west to Iceland Creek, to Grassy Trail Creek, and then to the Price River. Water from both forks of Lila Canyon flows southwest then south to the Price River by way of Grassy and Marsh Flat Washes. Little Park Wash flows south, where its waters pass through a short stretch of Trail Canyon before reaching the Price River.

There are no baseline data for the two Lila Canyon streams and the stream in Little Park Wash.

Supplemental information.

Baseline cumulative impact area information.

An important part of preparing the CHIA is determining the hydrologic systems or basins that can potentially be impacted. As discussed already, the PAP states that both Horse Canyon and Lila Canyon Creek flow to Iceland Wash, which is incorrect. Topographic maps show that after the two streams emerge from the Book Cliffs their flows diverge, with water from Horse Canyon flowing to the Price River by way of Iceland and Grassy Trail Creeks, while Lila Canyon Creek flows southwest then south to the

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Price River by way of Grassy and Marsh Flat Washes. Little Park Wash, which is a major drainage of the proposed permit area, is largely ignored in the PAP.

Much of the hydrologic and geologic information that is necessary to assess the probable cumulative hydrologic impacts of the proposed operation and all anticipated mining on surface- and ground-water systems for the cumulative impact area is probably available from federal and state agencies.

Any needed information that is not available from such agencies may be gathered and submitted by the applicant as part of the permit application. As discussed already, outside sources are referenced many times in Chapters 6 and 7, but the outside sources are not adequately described nor listed in a reference section. (A few are listed in Appendix 7-3.)

The permit cannot be approved until the necessary hydrologic and geologic information is available.

Modeling.

Modeling has not been used in preparation of the PAP.

Alternative water source information.

Probable hydrologic consequences determination.

Appendix 7-3 contains a determination of the probable hydrologic consequences (PHC) of the proposed operation based upon the quality and quantity of surface and ground water under seasonal flow conditions for the proposed permit and adjacent areas. The PHC determination is based on baseline hydrologic, geologic, and other information collected for the permit application, but not on data statistically representative of the site. The applicant finds in the PHC determination that, based on available data and expected mining conditions, the proposed mining and reclamation activity is not expected to proximately result in contamination, diminution or interruption of an underground or surface source of water within the proposed permit or adjacent areas that is used for domestic, agricultural, industrial or other legitimate purpose.

The applicant has determined that within the permit area, the general seasonal streamflow is ephemeral. The streams generally dry up by late spring with only occasional runoff during the summer resulting from rainfall events.

The applicant finds that, due to the close proximity and similarities of mining and drainage conditions, water quality and impacts to the channels from pumping the Lila Canyon Mine would be very similar to those experienced in the adjacent Horse Canyon Mine. However, the water-quality and downstream impacts that resulted from pumping the Horse Canyon Mine are not described or discussed adequately enough in the PAP for this comparison to be meaningful.

Because of the disturbed areas and the potential for large runoff events, the control of erosion is a prime factor in maintaining the hydrologic balance within the mine permit area. Sediment controls and a

sediment pond will be constructed at the new mine site to minimize impacts. Surface water will be protected by use of sediment controls and all sediment from the disturbed area is to be delivered to and be deposited in the sediment pond.

Although subsidence presents a potential to alter the groundwater flow regime in the area, several factors tend to limit the effects of subsidence on the groundwater regime. Most of the local springs flow from perched systems in the North Horn Formation and are separated from the underlying regional aquifer. The North Horn contains swelling clays that tend to heal small fractures. Finally, the perched aquifers are lenticular and discontinuous so there is a great probability that fractures in one area will not drain all the different aquifers.

Springs are used by wildlife and livestock. Current conditions of springs and seeps reflect the impacts (if any) of 50 years of mining as well as pre-mining conditions. No depletion of flow and quality of springs is expected in the Lila Canyon area. The applicant has determined that to date there is no known depletion of flow and quality of surveyed springs in the Horse Canyon permit area. The basis for this determination is not clear: on page 13 of the PAP the applicant states that it is impossible to precisely describe the area's pre-mining hydrology.

The applicant has determined that it is unlikely there will be any additional measurable impacts from the mining and reclamation activities at the Lila Canyon Mine. Springs are mostly located upstream of the permit areas or are in areas where subsidence resulting from post-1977 mining has not been documented and is not expected. Springs above the mine should continue to flow, showing fluctuations that are related to variations in recharge.

The applicant finds that after reclamation it is unlikely that the groundwater level in the regional aquifer will ever rise to the level of any portal of either the Horse Canyon or Lila Canyon Mines, so there should be no natural discharge of groundwater through any sealed portals. Stand pipes are to be incorporated into the sealed portals of the Lila Canyon Mine so that water levels can be checked annually.

In the PHC the applicant finds that, based on available data and expected mining conditions, the proposed mining and reclamation activity is not expected to proximately result in contamination, diminution or interruption of any underground or surface source of water within the proposed permit or adjacent areas; however, some subjects, such as acid-forming or toxic-forming materials, flooding or streamflow alteration, and ground water and surface water availability, that are not clearly covered in the PHC could use further clarification. Numerous technical deficiencies have been identified in the PAP. Additional information that will be provided to meet those deficiencies may necessitate revision or at least expansion of the PHC determination.

Ground-water and Surface-water Monitoring Plans.

The applicant has based the ground-water and surface-water monitoring plans on the PHC determination and the analysis of baseline hydrologic, geologic, and other information in the permit application.

Water samples from seeps, springs, and streams will be analyzed for the parameters listed in Table 7-4. The parameters in Table 7-4 closely match those in Tech 004 except that dissolved iron and total

alkalinity are not listed. Measuring total alkalinity is a necessary step in determining carbonate and bicarbonate so it is usually reported routinely by laboratories; it should be included by the applicant in water-quality reports. Total manganese is listed in the body of Table 7-4 with a note that analysis will be done for dissolved manganese; this has the potential for causing confusion in the future and the two parameters should be specifically listed in Table 7-4. Likewise, dissolved iron should be added to Table 7-4.

Table 7-4 indicates that oil and grease is to be analyzed for in samples taken below the mine site only rather than at sites both above and below as recommended in Tech 004. A footnote indicates that this analysis will be done for designated samples. Oil-and-grease needs to be determined both above and below the mine site to be an effective water-quality indicator, and the sites at which it will be measured need to be clarified.

Table 7-4 indicates that cation anion balance is to be determined only for surface-water samples taken below the mine site rather than at all locations: this is an important quality control measure and should be routine in all water-quality analyses.

Monitoring reports will be submitted to the Division at least every three months, within 30 days following the end of each quarter.

The applicant's water-monitoring plan is intended to provide data to show impacts to potentially affected springs, seeps, impoundments and drainages within and adjacent to the permit area by comparison with relevant baseline data and with applicable effluent limitations. The applicant has selected monitoring locations and frequencies, described in Table 7-3, so that significant springs, seeps, impoundments and drainages that could potentially be impacted by the mining and reclamation operations will be monitored on a regular basis. (p. 34).

Ground-water monitoring plan.

The applicant states that the only ground water resources on or adjacent to the permit area that can be monitored at this time are springs and seeps. The three IPA wells are not listed as ground-water monitoring sites. Water depths in these wells should be monitored during coal mine operation and reclamation, unless subsidence or other effects of mining render them unusable. A-26 and A-31 were bored as offsets to S-26 and S-31 to observe ground-water levels in the alluvium south of the Williams Draw Fault. Table VI-3 does not indicate that these wells have been plugged and abandoned. S-32 was drilled in 1981 and completed as a piezometer in the Grassy Member of the Blackhawk Formation. The possibility of using S-32, A-26, and A-31 as ground-water monitoring wells cannot be determined because their current status is not discussed in the PAP.

Seven operational ground-water monitoring sites, L-5-G through L-11-G, are proposed. They are listed in Table 7-3 and locations are shown on Plate 7-4. Seeps and springs will be monitored quarterly. Station L-5-G is the potential mine discharge point and will be monitored in accordance with UPDES Permit requirements.

Stations L-6-G through L-11-G are significant springs located over the area of proposed mining. The relationship of these springs to seeps and springs monitored previously by JBR Consultants, EarthFax

Engineering, and others is not clear. The names do not correspond to those used in gathering earlier data, and locations on Plate 7-4 do not clearly correspond with locations on Plate 7-1.

Four of the springs proposed for operational monitoring are identified by the applicant as L-8-G (Cottonwood Spring), L-9-G, L-10-G (Pine Spring), and L-11-G and correspond roughly with the springs monitored by EarthFax as 9, 10, 16Z, and 14, respectively. Springs 9, 10, 16Z, and 14 have data from 1993, 1994, and 1995 but nothing more recent. L-6-G (Mont Spring) and L-7-G (Leslie Spring) correspond roughly with a group of springs monitored by JBR Consultants in 1985, but there are not adequate baseline data in the PAP for any of the JBR springs.

Surface-water monitoring plan.

Intermittent drainages in the area flow in response to snowmelt and precipitation events. The proposed surface-water monitoring program will monitor Lila Canyon both above and below the disturbed mine site area at L-1-S, L-2-S, and L-3-S and the sediment pond discharge at L-4-S. No monitoring is proposed for Little Park Wash, which appears to be the major surface drainage in the permit area.

Streams will be monitored monthly. Sediment pond and mine discharges will be monitored monthly or as frequently as discharges occur.

Point-source discharge monitoring will be conducted in accordance with 40 CFR Parts 122 and 123, R645-301-751 and as required by the Utah Division of Environmental Health for Utah Pollutant Discharge Elimination System (UPDES) permits. A UPDES discharge permit application has been submitted to the Division of Environmental Health for the proposed sediment pond and mine water for the Lila Canyon operation. UPDES permit applications for the Lila Canyon Mine are provided in Appendix 7-5 (p.34).

Findings:

Hydrologic Resource Information is not considered adequate to meet the requirements of this section. Prior to approval the applicant must provide the following information:

R645-301-724.100 - There are no hydrologic data from A-26 and A-31, located south of the Williams Draw fault, in the PAP.

R645-301-724.100 - Two wells were located in the alluvium in lower Horse Canyon Creek. These wells have been plugged abandoned according to the PAP. These wells apparently monitored water in the alluvium; however, Section 722.400 implies these may have been water production wells. There are no hydrologic data from these two wells in the PAP.

R645-301-724.100 - S-32 was drilled in 1981 and completed as a piezometer in the Grassy Member of the Blackhawk Formation. The PAP contains no baseline data on ground-water elevation or quality for S-32.

R645-301-724.100 - In 1993 and 1994 IPA-1, IPA-2, and IPA-3 were drilled. There are seasonal water-level measurements in the PAP for IPA-1, IPA-2, and IPA-3 for 1994, 1995, and

1996 but no baseline data for 1997 or 1998.

R645-301-724.100 - A-26 and A-31 were bored as offsets to S-26 and S-31 to observe ground-water levels in the alluvium south of the Williams Draw Fault. Table VI-3 does not indicate that these wells have been plugged and abandoned, so it is not clear whether or not these wells are currently available for monitoring.

R645-301-724.100 - There are not adequate baseline data in the PAP for any of the JBR springs. H-1, H-6, H-18, and H-21 from the JBR survey in 1985 were sampled, possibly for further water-quality analysis, but there are no analysis results in the PAP for these four springs.

R645-301-724.100 - H-21A, H-21B, H18A, and H-18B from the JBR survey in 1985 are shown on Plate 7-1 but not listed or discussed in the PAP.

R645-301-724.100 - HC-1, HC-1A, and an unidentified spring or seep 1,000 feet southeast of HCSW-2, all apparently from the EarthFax survey in 1993, 1994, and 1995, are shown on Plate 7-1 but not listed or discussed any other place in the PAP.

R645-301-724.100 - The applicant asserts there are no water supply wells in the permit and adjacent areas (Chapter 7, p. 7) even though a well is listed in Table 7-2.

R645-301-724.100 - The quarterly samples from Redden Spring were analyzed for all required parameters except total manganese.

R645-301-724.100 - RS-1 and RS-2 were sampled once a year during 1978, 1979, and 1980 and analyzed for most major chemical constituents. In addition, springs H-6, H-18, and H-21 were sampled once and analyzed for the major constituents in 1985. Third quarter data for 1989 were collected for HC-1 and RF-1 and sampled for most of the parameters in UDOGM's guidelines. This is briefly mentioned in Appendix 7-3 but these data are not in the PAP and the results of the analyses are not discussed with the baseline information. There is no reference for the source of these data.

R645-301-724.100, -724.200 - Between January 1981 and April 1983, baseline water quality data was collected for surface water and spring sites B-1, HC-1, RF-1 and RS-2 on the Horse Canyon permit area. Between 14 and 19 samples were taken and analyzed during the monitoring period depending on the site. These data are briefly mentioned in Appendix 7-3 but are not in the PAP and the results of the analyses are not discussed with the baseline information. There is no reference for the source of these data.

R645-301-724.200 - The U.S. Geological Survey conducted a water quality study in Horse Canyon from August 1978 until September 1979. Samples were taken monthly from the Horse Canyon Creek and analyzed for most major ions and cations and field parameters. Metals, eight nitrogen species and other minor chemical constituents were taken on a quarterly basis or less. This is briefly mentioned in Appendix 7-3 but these data are not in the PAP and the results of the analyses are not discussed with the baseline information.

There is no reference for the source of these data.

R645-301-724.200 - The main drainage through the permit area, Little Park Wash, is mentioned on page 10 and in Tables 7-2 and 7-3 but is not further described or discussed.

R645-301-724.200 - Range Creek drainage is mentioned on page 10 and in Table 7-2 but is not further described or discussed.

R645-301-724.200 - There are no baseline data for the two Lila Canyon streams and the stream in Little Park Wash.

R645-301-724.200 - The only flow data for Horse Canyon Creek in the PAP are in the Horse Canyon Mine 1997 Annual Report in Appendix 7-2. Additional data for Horse Canyon Creek are available from other annual reports of the Horse Canyon Mine and these data should be included and evaluated in the PAP.

R645-301-121.200, -724.200 - Data in Appendix 7-2 do not clearly support the statement on page 15 that "Flows in Horse Canyon, generally, are limited to the early spring period (Lines and Plantz, 1981). By late spring to early summer, usually no flow is evident in Horse Canyon Creek... ." Although flows decrease, the data show there is still flow in late summer and early fall, which indicates possible perennial flow in Horse Canyon Creek above the Horse Canyon Mine.

R645-301-121.200, -724.200 - The PAP states on page 15 that Lila Canyon Creek is an ephemeral drainage, but on page 33 and again in Table 7-3 Lila Canyon is described as intermittent. The main or left fork of Lila Canyon drains an area of several square-miles, so, assuming it is not a perennial drainage, it fits the definition of an intermittent drainage in the Coal Mining Rules. The Right Fork of Lila Canyon is described as ephemeral above the mine on page 33 but as intermittent in Table 7-3. Lila Canyon (Right Fork?) is described as intermittent "below mine" on page 33, but Table 7-3 states it is intermittent "below stream" rather than below the mine site. These inconsistent and potentially confusing descriptions need to be clarified.

R645-301-121.200, -724.200, -729 - On page 15 of Chapter 7, the PAP states that both Horse Canyon and Lila Canyon Creek flow to Iceland Wash, which in turn flows to Grassy Trail Creek and the Price River; however, topographic maps show that after the two streams emerge from the Book Cliffs their flows diverge. Water from Horse Canyon flows west to Iceland Creek, to Grassy Trail Creek, and then to the Price River. Water from both forks of Lila Canyon flows southwest then south to the Price River by way of Grassy and Marsh Flat Washes. Little Park Wash flows south, where its waters pass through a short stretch of Trail Canyon before reaching the Price River. Inconsistent and potentially confusing descriptions need to be clarified.

R645-301-724.200, -728 - In the PHC the applicant finds that to date there is no known depletion of flow and quality of surveyed springs in the Horse Canyon permit area. The basis for this determination is not clear: on page 13 of the PAP the applicant states that it is

impossible to precisely describe the area's pre-mining hydrology.

R645-301-724.200, -728 - In the PHC the applicant finds that, due to the close proximity and similarities of mining and drainage conditions, water quality and impacts to the channels from pumping the Lila Canyon Mine would be very similar to those experienced in the adjacent Horse Canyon Mine. However, the water-quality and downstream impacts that resulted from pumping the Horse Canyon Mine are not described or discussed adequately enough in the PAP for this comparison to be meaningful.

R645-301-724, -728 - In the PHC the applicant finds that, based on available data and expected mining conditions, the proposed mining and reclamation activity is not expected to proximately result in contamination, diminution or interruption of any underground or surface source of water within the proposed permit or adjacent areas; however, some subjects, such as acid-forming or toxic-forming materials, flooding or streamflow alteration, and ground water and surface water availability, that are not clearly covered in the PHC could use further clarification. Numerous technical deficiencies have been identified in the PAP. Additional information that will be provided to meet those deficiencies may necessitate revision or at least expansion of the PHC determination.

R645-301-731.210 - The three IPA wells are not listed as ground-water monitoring sites. Water depths in these wells should be monitored during coal mine operation and reclamation, unless subsidence or other effects of mining render them unusable.

R645-301-731.210 - The possibility of using S-32, A-26, and A-31 as ground-water monitoring wells cannot be determined because their current status is not discussed in the PAP.

R645-301-731.210 - The relationship of operational monitoring springs L-6-G through L-11-G to seeps and springs monitored previously by JBR Consultants, EarthFax Engineering, and others is not clear. The names do not correspond to those used in gathering earlier data, and locations on Plate 7-4 do not clearly correspond with locations on Plate 7-1.

R645-301-731.210 - Four of the springs proposed for operational monitoring are identified by the applicant as L-8-G (Cottonwood Spring), L-9-G, L-10-G (Pine Spring), and L-11-G and correspond roughly with the springs monitored by EarthFax as 9, 10, 16Z, and 14, respectively. The PAP contains data for Springs 9, 10, 16Z, and 14 from 1993, 1994, and 1995 but nothing more recent.

R645-301-724.100, -731.210 - L-6-G (Mont Spring) and L-7-G (Leslie Spring) correspond roughly with a group of springs monitored by JBR Consultants in 1985, but there are not adequate baseline data in the PAP for any of the JBR springs.

R645-301-731.210, -731.220 - The parameters in Table 7-4 closely match those in Tech 004 except that dissolved iron and total alkalinity are not listed. Measuring total alkalinity is a necessary step in determining carbonate and bicarbonate so it is usually reported routinely by laboratories along with carbonate and bicarbonate, and it should be included by the applicant in water-quality reports.

R645-301-731.210, -731.220 - Dissolved iron should be added to Table 7-4.

R645-301-731.210, -731.220 - Total manganese is listed in the body of Table 7-4 with a footnote that analysis will be done for dissolved manganese; this has the potential for causing confusion in the future and the two parameters should be specifically listed in Table 7-4.

R645-301-731.210, -731.220 - Table 7-4 indicates that oil and grease is to be analyzed for in samples taken below the mine site only rather than at sites both above and below as recommended in Tech 004. A footnote indicates that this analysis will be done for designated samples. Oil-and-grease needs to be determined both above and below the mine site to be an effective water-quality indicator, and the sites at which it will be determined need to be clarified.

R645-301-731.210, -731.220 - Table 7-4 indicates that cation anion balance is to be determined only for surface-water samples taken below the mine site rather than at all locations; this is an important quality control measure and should be routine in all water-quality analyses.

R645-301-731.220 - No monitoring is proposed for Little Park Wash, which appears to be the major surface drainage in the permit area.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Affected Area Boundary Maps

Archeological Site Maps

Coal Resource and Geologic Information Maps

Depth to the Sunnyside Seam, which is the seam to be mined, is shown on the Cover and Structure Map on Plate 6-4. Thickness of the Sunnyside Seam is shown on the Coal Thickness Isopach map on Plate 6-3. Thickness and nature of the Sunnyside Seam, of coal or rider seams above the Sunnyside Seam, and of the stratum immediately below the Sunnyside Seam are shown on the Coal Sections on Plate 6-5, but these sections do not show areal and vertical distribution of aquifers or information on water levels and the relationship of ground water to geologic structure and stratigraphy. There is no cross section showing the relationship of the rock tunnels to structure, stratigraphy, and ground water.

Figures VI-1 and VI-2 show the general stratigraphy of the permit and adjacent areas. Plate 6-1 shows surface geology, including coal crop lines, and the strike and dip of the Sunnyside Seam within the proposed permit area. The major faults are shown on Plates 6-1 through 6-5, and structural elevation contours on the Sunnyside Seam are on Plate 6-4. Reference is made to the Sunnyside fault, especially as a feature that possibly controls ground-water flow, but this fault is not shown on the maps.

Lease information is included on Plates 6-3 and 6-4. This makes it difficult to read the geologic information, and there is no evident reason for the lease information to be on these maps.

The coal seam crops out at approximately 6,500 feet in the vicinity of the rock-slope tunnels. The PAP indicates the tunnels will intercept the coal seam at approximately 6,300 feet. Structural elevation contours on Plate 6-4 stop at 6,000 feet, at least in the permit area, so do not accurately indicate the elevation of the coal seam where the tunnels will intercept it. The coal may be shallower, under less cover and dip more steeply than indicated on Plates 6-4 and 7-1 and any other maps that show structure contours. Coal-seam elevations determined from bore holes are on Plate 6-2, which does not show structure elevation contours, but are not on Plate 6-4, the cover and structure map.

Existing Structures and Facilities Maps

Existing Surface Configuration Maps

Cultural Resource Maps

Mine Workings Maps

Location and extent of the Horse Canyon Mine permit area is outlined on numerous plates in the PAP, including Plate 5-1, but it is not clear where mining was done and not done within this permit area. Plate 5-1 shows old or abandoned mine workings outside the Horse Canyon permit area, except the 6,080-foot exploration entry from the Horse Canyon Mine is not shown. Locations of sealed openings to the Horse Canyon Mine and other mines are not identified. Plate 5-1 shows an area west of the Horse Canyon Mine, outside the line marking the limits of old works, labeled "Book Cliffs Coal Company", and hatched in red: what this represents is not clear. The active coal fire area in the old workings north of Horse Canyon is not shown on any map or discussed in the text.

Monitoring Sampling Location Maps

Elevations and locations of test borings are on Plates 6-2, 6-3, and 6-4, except that the location of S-32 is not shown on any map. Elevations of core samples are tabulated in Tables VI-1 and VI-3.

Elevations and locations of monitoring stations used to gather data on water quality and quantity in preparation of the application are on Plate 7-1; however, springs or seeps H-7, 8B, 15A, 17B, 18A, 19C, 22, HC-2, HC-4, HC-9, HC-11, HC-13, HC-14, HC-18, HCSW-1, HCSW-3, and Redden Spring (RS-2) could not be found on Plate 7-1. HC-1, HC-1A, and an unidentified spring or seep next to HCSW-2 are shown on Plate 7-1 but not listed or discussed in the PAP.

Permit Area Boundary Maps

Subsurface Water Resource Maps

Ground water was encountered in several of the bore holes as well as in the Horse Canyon Mine. Water-level elevation contours are on Plate 7-1; otherwise, areal and vertical distribution of aquifers within the proposed permit or adjacent areas is not shown on a map. Seasonal variation in water levels is tabulated in Appendix 7-1, but there is no portrayal of seasonal differences of head on cross sections and contour maps.

The PAP states that the locations of the two shallow wells bored in Horse Canyon to observe alluvial ground water are on Plate 7-1, but if they are shown on that, or another, map they are not clearly identified. Likewise the locations of A-26 and A-31 are not clearly identified on any map.

The ground-water elevation in the Horse Canyon Mine, at the rotary car dump at the intersection of the Main slope and 3rd level, is described on page 14 in Chapter 7 of the PAP; it was approximately 5,800 feet in 1986 and the applicant states that it probably has remained at this level since operations ceased in the Horse Canyon Mine. This projected ground-water elevation does not appear to have been used in projecting the piezometric surface mapped on Plate 7-1. The location is described in the text, but the location is not shown on Plate 7-1.

Locations of all known seeps and springs are stated to be shown on Plate 7-1. Water quality and quantity data for springs or seeps 8B, 15A, 17B, 18A, 19C, HC-2, HC-4, HC-9, HC-11, HC-13, HC-14, HC-18, HCSW-1, and HCSW-3 are in Appendix 7-1 but their locations could not be found on Plate 7-1. H-7 is listed in Table 7-1 but is not shown on Plate 7-1. There are several springs listed in Table 7-2 - Water Rights - and shown on Plate 7-3 that are not shown on Plate 7-1. Water quality data for Redden

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Spring (RS-2) are in Appendix 7-2 but the location for this spring could not be found on Plate 7-1. HC-1, HC-1A, and an unidentified spring or seep next to HCSW-2 are shown on Plate 7-1 but not listed or discussed in the PAP.

Water rights are listed in Table 7-2. The list includes Redden Spring plus springs identified as Mont, Leslie, Cottonwood, Willows, Konna, and Pine. In addition there are eleven unnamed or otherwise unidentified springs listed, plus a well. Locations are on Plate 7-3, and some of the spring locations on Plate 7-3 correspond roughly with springs shown on Plate 7-1, but it is unclear that these are the same springs.

The applicant asserts there are no water supply wells in the permit and adjacent areas (Chapter 7, p. 7) even though a well is listed in Table 7-2. That well is not shown, or at least not clearly identified, on a map.

Surface and Subsurface Manmade Features Maps

Surface and Subsurface Ownership Maps

Surface Water Resource Maps

Locations of all known seeps and springs as well as watering tanks or ponds are shown on Plate 7-1. According to the applicant there are no known streams, lakes, or ponds within the permit and adjacent areas.

Text on page 7 refers to Plate 7-1 for the location of Horse Canyon and Lila Canyon Creeks but none of the drainages are labeled on that map, or other maps in Chapters 6 and 7. The main drainage through the permit area, Little Park Wash, is mentioned on page 10 and in Tables 7-2 and 7-3, and Range Creek drainage is mentioned on page 10 and in Table 7-2 but neither is labeled on maps.

Water rights are listed in Table 7-2 and shown on Plate 7-3.

Vegetation Reference Area Maps

Well Maps

One oil exploration hole has been drilled on the property by Forest Oil Company. The location of the hole is shown on Plate 6-2. The depth and other details of this well are not known.

Contour Maps

Surface-elevation contours are displayed on several maps. On Plate 7-1 the 250-foot index contours were not printed, adding to the confusing appearance of the map.

Certification

All maps and plans were prepared by, or under the direction of, and certified by a qualified,

registered, professional engineer, with assistance from experts in related fields (p. 3).

Findings:

Maps, Plans, And Cross Sections of Resource Information is not considered adequate to meet the requirements of this section. Prior to approval the applicant must provide the following information:

- R645-301-622.200** - The coal seam crops out at approximately 6,500 feet in the vicinity of the rock-slope tunnels. The PAP indicates the tunnels will intercept the coal seam at approximately 6,300 feet. Structural elevation contours on Plate 6-4 stop at 6,000 feet, at least in the permit area, so do not accurately indicate the elevation of the coal seam where the tunnels will intercept it. The coal may be shallower, under less cover, and dip more steeply than indicated on Plates 6-4 and 7-1 and other maps that show structure contours.
- R645-301-121.200, -622.200** - Coal-seam elevations determined from bore holes are on Plate 6-2, which does not show structure elevation contours, but are not on Plate 6-4, the cover and structure map.
- R645-301-121.200, -622.200** - Lease information is included on Plates 6-3 and 6-4. This makes it more difficult to read the thickness, depth, and structure information on these maps, and there is no evident reason for the lease information to be on these maps.
- R645-301-622.100, -722.300** - The location of S-32 is not shown on any map.
- R645-301-624.100, -624.110** - Reference is made in several places in the text to the Sunnyside fault, especially as a feature that possibly controls ground-water flow, but this fault is not shown, or at least not clearly identified, on the maps.
- R645-301-512.110, -521.111** - Location and extent of the Horse Canyon Mine permit area is shown on numerous plates in the PAP, including Plate 5-1 and maps in Chapters 6 and 7, but it is not clear where mining was done and not done within this permit area.
- R645-301-512.110, -521.111** - Plate 5-1 shows old or abandoned mine workings outside the Horse Canyon permit area, except the 6,080-foot exploration entry from the Horse Canyon Mine is not shown.
- R645-301-512.110, -521.111** - Locations of sealed openings to the Horse Canyon Mine and other mines are not identified on a map.
- R645-301-512.110, -521.111** - Plate 5-1 shows an area west of the Horse Canyon Mine, outside the line marking the limits of old works, labeled "Book Cliffs Coal Company", and hatched in red: what this represents is not clear.
- R645-301-512.110, -521.111** - The active coal fire area in the old workings north of Horse Canyon is not shown on any map or discussed in the text.

R645-301-623, -722, -731.521 - There is no cross section showing the relationship of the rock tunnels to the structure, stratigraphy, and ground water.

R645-301-624.100, -722.100 - There are no cross sections showing location and extent of ground water and its relation to geologic structure and stratigraphy.

R645-301-722.100 - The applicant asserts there are no water supply wells in the permit and adjacent areas (Chapter 7, p. 7) even though a well is listed in Table 7-2. That well is not shown, or at least not clearly identified, on a map.

R645-301-722.100 - Water-level elevation contours are on Plate 7-1; otherwise, areal and vertical distribution of aquifers within the proposed permit or adjacent areas is not shown on a map.

R645-301-722.100 - There is no portrayal of seasonal differences of head on cross sections and contour maps.

R645-301-722.100 - The ground-water elevation in the Horse Canyon Mine, at the rotary car dump at the intersection of the Main slope and 3rd level, is described on page 14 in Chapter 7 of the PAP; it was approximately 5,800 feet in 1986 and the applicant states that it probably has remained at this level since operations ceased in the Horse Canyon Mine.. This projected ground-water elevation does not appear to have been used in projecting the piezometric surface mapped on Plate 7-1.

R645-301-722.100 - The PAP states that the locations of the two shallow wells bored in Horse Canyon to observe alluvial ground water are on Plate 7-1, but if they are shown on that, or another, map they are not clearly identified. Likewise the locations of A-26 and A-31 are not clearly identified on any map.

R645-301-722.300 - The ground-water elevation in the Horse Canyon Mine, at the rotary car dump at the intersection of the Main slope and 3rd level, is described on page 14 in Chapter 7 of the PAP. The location is described in the text, but the location is not shown on Plate 7-1.

R645-301-722.100 - Text on page 7 refers to Plate 7-1 for the location of Horse Canyon and Lila Canyon Creeks but none of the drainages are labeled on that map, or other maps in Chapters 6 and 7. Little Park Wash and Range Creek are also mentioned in the text but are not identified on any maps.

R645-301-722.200, -722.300 - Locations of all known seeps and springs are stated to be shown on Plate 7-1. Water quality and quantity data for springs or seeps 8B, 15A, 17B, 18A, 19C, HC-2, HC-4, HC-9, HC-11, HC-13, HC-14, HC-18, HCSW-1, and HCSW-3 are in Appendix 7-1 but their locations could not be found on Plate 7-1.

R645-301-722.200, -722.300 - Spring H-7 is listed in Table 7-1 but is not shown on Plate 7-1.

R645-301-722.200 -722.300 - Locations of all known seeps and springs are stated to be shown on Plate 7-1. There are several springs listed in Table 7-2 - Water Rights - and shown on Plate 7-3 that are not shown on Plate 7-1, or that do not clearly correspond to springs on Plate 7-1.

R645-301-722.200 -722.300 - Water quality data for Redden Spring (RS-2) are in Appendix 7-2 but the location for this spring could not be found on Plate 7-1.

R645-301-722 - Surface-elevation contours are displayed on several maps. On Plate 7-1 the 250-foot index contours were not printed, adding to the confusing appearance of the map.

OPERATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Ground-water monitoring.

Ground-water monitoring will be conducted according to the ground-water monitoring plan in Section 731.210 of the PAP; the Technical Analysis of that plan, including deficiencies, is in the Hydrologic Resource Information section of this TA and is not repeated here.

Mine discharges will be monitored monthly or as frequently as discharges occur. Seeps and springs will be monitored quarterly.

Ground-water monitoring data are to be submitted every three months to the Division. Sections 731.212 of the PAP contains a commitment from the applicant that when the analysis of any ground-water sample indicates noncompliance with the permit conditions, the operator will promptly notify the Division and immediately take the actions provided for in "145 and 731"; it is not clear what "145 and 731" are.

It is not clear from the PAP when operational ground-water monitoring will begin.

The applicant commits in Section 731.215 that equipment, structures and other devices used in conjunction with monitoring the quality of ground water on-site and off-site will be properly installed, maintained and operated and will be removed by the operator and will be removed by the operator when no longer needed.

Surface-water monitoring.

Surface-water monitoring will be conducted according to the ground-water monitoring plan in Section 731.220 of the PAP; the Technical Analysis of that plan, including deficiencies, is in the Hydrologic Resource Information section of this TA and is not repeated here.

Streams will be monitored monthly. Sediment pond and mine discharges will be monitored monthly or as frequently as discharges occur.

Point-source discharge monitoring will be conducted in accordance with 40 CFR Parts 122 and 123, R645-301-751 and as required by the Utah Division of Environmental Health for Utah Pollutant Discharge Elimination System (UPDES) permits. A UPDES discharge permit application has been submitted to the Division of Environmental Health for the proposed sediment pond and mine water for the Lila Canyon operation. UPDES permit applications for the Lila Canyon Mine are provided in Appendix 7-5 (p. 34).

Monitoring reports will be submitted to the Division at least every three months, within 30 days following the end of each quarter (p.33). When analysis of any surface water sample indicates non-compliance with the permit conditions, the company will promptly notify the Division and immediately take actions to identify the source of the problem, correct the problem and, if necessary, to provide warning to any person whose health and safety is in imminent danger due to the non-compliance (p. 35).

It is not clear from the PAP when operational surface-water monitoring will begin.

The applicant commits in Section 731.225 that equipment, structures and other devices used in conjunction with monitoring the quality of ground water on-site and off-site will be properly installed, maintained and operated and will be removed by the operator and will be removed by the operator when no longer needed.

The applicant proposes in Section 731.121 that surface-water quality protection is to be accomplished by the plan described in Section 731 and the following methods:

- (1) Minimizing surface disturbance and proper handling of earth materials to minimize acidic, toxic or other harmful infiltration to ground-water systems;
- (2) Testing (as-necessary) to ensure stockpiled materials are non-acid and non-toxic;
- (3) Controlling and treating disturbed area runoff to prevent discharge of pollutants into surface-water, by the use of diversions, culverts, silt fences, sediment ponds, and by chemical treatment if necessary;
- (4) Minimizing and/or treating mine water discharge to comply with UPDES discharge standards;
- (5) Establishing where surface-water resources exist within or adjacent to the permit area through a baseline study and monitoring quality and quantity of significant sources through implementation of a Water Monitoring Plan;
- (6) Proper handling of potentially harmful materials (such as fuels, grease, oil, etc.) in accordance with an approved Spill Prevention Control and Countermeasure Plan (SPCC).

Acid and toxic-forming materials.

Underground development waste will be stored in a designated area. Such waste will be tested for acid- or toxic-forming potential, and if found to be acid- or toxic-forming, the waste site will be protected from surface runoff by the use of earthen berms (p. 39).

All storage, burial and treatment practices will be as described in this permit, and consistent with applicable material handling and disposal provisions of the R645-Rules (p. 40).

Transfer of wells.

Discharges into an underground mine.

Gravity discharges from underground mines.

The proposed access portals are below the coal outcrop, as shown on Plates 5-2 and 7-5. The fan is to be located above the outcrop. The two 1,227 foot long slopes will slope up at approximately 12%, from a starting elevation of approximately 6150'. The intersection of the coal seam and the rock slope will take place at approximately 6,300 feet elevation. Maximum ground-water elevation measured in the three IPA wells was 5,972 feet, and maximum elevation in the vicinity of the rock-slope tunnels is approximately 6,000 feet (Plate 7-1), so the likelihood that the rock slopes will intercept ground water in the regional aquifer is small.

The applicant states on page 44 that the water level in the mine would need to rise approximately 20 feet to reach the contact of the rock slope with the coal seam and produce a gravity discharge through the tunnels. It is not clear what this means; the numbers provided in the PAP indicate ground-water levels would need to rise approximately 150 feet just to reach the starting elevation of the tunnels and 300 feet to reach the intersection of the tunnel with the coal seam.

Surface entries and accesses of drift mines are to be located so as to prevent or control gravity discharge from the mine. There is no cross section showing location and extent of ground water and its relation to geologic structure and stratigraphy. There is no cross section showing the relationship of the rock tunnels to the structure, stratigraphy, and ground water.

Water quality standards and effluent limitations.

UPDES permit applications for the Lila Canyon Mine are provided in Appendix 7-5 (p.34).

Casing and sealing of wells.

Findings:

Operation Plan Hydrologic Information is not considered adequate to meet the requirements of this section. Prior to approval the applicant must provide the following information:

R645-301-731.521 - The applicant states on page 44 that the water level in the mine would need to rise approximately 20 feet to reach the contact of the rock slope with the coal seam and produce a gravity discharge through the tunnels. It is not clear what this means; the numbers provided in the PAP indicate ground-water levels would need to rise approximately 150 feet just to reach the starting elevation of the tunnels and 300 feet to reach the intersection of the tunnel with the coal seam.

R645-301-731.212 - Section 731.212 of the PAP contains a commitment from the applicant that when the analysis of any ground-water sample indicates noncompliance with the permit conditions, the operator will promptly notify the Division and immediately take the actions provided for in 145 and 731; it is not clear what "145 and 731" are.

R645-301-731.210 - It is not clear from the PAP when operational ground- and surface-water monitoring will begin.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Monitoring and Sampling Location Maps

See the Maps, Plans, and Cross Sections in Resource Information. A TA of Monitoring and Sampling Location Maps was done in that section and is not repeated here.

Ground-water and surface-water monitoring sites are listed in Table 7-3 and locations are shown on Plate 7-4. The proposed surface-water monitoring program will monitor Lila Canyon both above and below the disturbed mine site area at L-1-S, L-2-S, and L-3-S and the sediment pond discharge at L-4-S. No monitoring is proposed for Little Park Wash, which appears to be the major surface drainage in the permit area. Seven ground-water monitoring sites, L-5-G through L-11-G, are proposed. Seeps and springs will be monitored quarterly. Station L-5-G is the potential mine discharge point and will be monitored in accordance with UPDES Permit requirements. Stations L-6-G through L-11-G are springs located over the area of proposed mining. The relationship of these springs to seeps and springs monitored previously by JBR Consultants, EarthFax Engineering, and others is not clear. The names do not correspond to those used in gathering earlier data, and locations on Plate 7-4 do not clearly correspond with locations on Plate 7-1.

Certification Requirements.

All cross sections, maps and plans required by R645-301-722 as appropriate, and R645-301-731.700 have been prepared and certified according to R645-301-512 (p. 4).

Findings:

The Monitoring and Sampling Location Maps for the Mining Operations Plan provided in the PAP are not considered adequate to meet the requirements of this section. The deficiencies are listed in the Maps, Plans, and Cross Sections of the Resource Information section and are not repeated here.

RECLAMATION PLAN

GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

MINE OPENINGS

Regulatory Reference: 30 CFR Sec. 817.13, 817.14, 817.15; R645-301-513, -301-529, -301-551, -301-631, -301-748, -301-765, -301-748.

Analysis:

When monitoring wells IPA-1, IPA-2, and IPA-3 are no longer required they will be sealed in a safe, environmentally sound manner in accordance with regulations (PAP section 731.400). If any wells are installed in the future they will be cased and sealed according to the regulations (PAP section 748).

Findings:

Information on reclamation of wells is considered adequate to meet the requirements of the Mine Openings section of the Reclamation Plan.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751.

Analysis:

Ground-water monitoring.

Reclamation hydrology is described in PAP section 760 and in Appendix 7-4. PAP section 760 refers to Appendix 7-4. Appendix 7-4 contains no information on ground-water monitoring during reclamation.

Surface-water monitoring.

Reclamation hydrology is described in PAP section 760 and in Appendix 7-4. PAP section 760 refers to Appendix 7-4. Appendix 7-4 contains no information on surface-water monitoring during reclamation.

Acid and toxic-forming materials.

Transfer of wells.

There are no wells planned for the Lila Canyon Mine; however, if any wells are installed in the future, they will be permanently sealed in accordance with section 765 of the Coal Mining Rules (p. 85).

Discharges into an underground mine.

Gravity discharges.

Water quality standards and effluent limitations.

Diversions.

Stream buffer zones.

Sediment control measures.

Siltation structures.

Sedimentation ponds.

Other treatment facilities.

Exemptions for siltation structures.

Discharge structures.

Impoundments.

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Casing and sealing of wells.

There are no wells planned for the Lila Canyon Mine; however, if any wells are installed in the future, they will be permanently sealed in accordance with section 765 of the Coal Mining Rules (p. 85).

Findings:

Reclamation hydrologic information is not considered adequate to meet the requirements of this section. Prior to approval the applicant must provide the following information:

R645-301-751 - Appendix 7-4 contains no information on surface- and ground-water monitoring during reclamation.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

Affected Area Boundary Maps

Bonded Area Map

Reclamation Backfilling and Grading Maps

Reclamation Facilities Maps

Final Surface Configuration Maps

Reclamation Monitoring and Sampling Location Maps

There is no reclamation ground- or surface-water monitoring Plan in the PAP.

Certification Requirements

Findings:

Information on Maps, Plans, and Cross Sections of reclamation hydrologic monitoring and sampling is not considered adequate to meet the requirements of this section. Prior to approval the applicant must provide the following information:

R645-301-751 - There is no reclamation ground- or surface-water monitoring Plan in the PAP.

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CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

The Division will provide an assessment of the probable cumulative hydrologic impacts (CHIA) of the proposed operation and all anticipated mining upon surface- and ground-water systems in the cumulative impact area. The CHIA will be sufficient to determine, for purposes of permit approval, whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area. The Division intends to use data and analyses submitted by the applicant in the Lila Canyon Mine PAP.

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